

Very high energy gamma rays from Centaurus A and two zone lepto-hadronic modelling

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Abstract content

The spectrum of UHECR signal events above 55 EeV from Centaurus A (Cen A) can provide a useful hint about the injected spectrum of cosmic ray nuclei. The injected spectrum connects UHECRs to the HESS detected GeV-TeV gamma rays. The 8 years of Fermi-LAT data from Cen A has significant hardening in the GeV energy. In an attempt to understand the origin of this hardening, we explore two emitting zones in the jet of Cen A. We consider two scenarios: (i) Two zone synchrotron self-Compton (SSC) and external-Compton (EC) models, (ii) Two zone SSC, EC and photo-hadronic emission from cosmic ray interactions. The GeV hardness observed by Fermi-LAT can be explained using these two scenarios, where zone 2 EC emission is very important. Photo-hadronic emission in scenario (ii) can explain VHE data with the same spectral slope as obtained through fitting UHECRs from Cen A.

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